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GARSON

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THE FRENKEL SYSTEM OF EXERCISES FOR TABES.

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THE following case is of interest as illustrating the beneficial effects which result from the systematic practice of the exercises designed by Dr. Frenkel of Heiden for restoring the power of co-ordinate movements in persons affected by tabes dorsalis. It shows how a person who has been reduced to a state of almost complete invalidism may by this means regain the power of locomotion so as to be able to live a comfortable and useful life.

A. B., aged 39, was admitted on April 30th, 1908, suffering from tabes dorsalis in the ataxic stage. He had contracted syphilis fourteen years previously, from which he had suffered severely, and had treatment continuously for about three years. Neurasthenic symptoms occurred in 1905, which were soon afterwards followed by girdle pains, bladder symptoms, and difficulty in walking. Tabes dorsalis was definitely diagnosed by Dr. Risien Russell, by whom he was treated for a time. The ataxic symptoms had gradually increased in severity till he was able to walk only by aid of two sticks. When I first saw him he had a very pronounced ataxic gait and frequently fell, so that it was no longer safe for him to walk in the streets alone. The knee reflexes were entirely gone, Romberg's sign was very marked, and the Argyll Robertson pupil present. The girdle pains and bladder trouble continued, and varied in severity at different times. Ocular symptoms did not then trouble him, and he had fair control over the sphincter ani. The muscles of the lower limbs were in good condition, but slow of action. There was some increase in the range of movement in the joints and some degree of hypotonia, likewise some loss of sensibility of the skin, muscles, and joints, particularly the knee. The symptoms were rather more marked on the left than on the right side. Owing to the falls he had had he was very nervous in walking. He was utterly unfit to follow any pursuit, and the prospect in life before him was very unfavourable.

As the patient had been treated for some time for the disease, which appeared to have remained, for some months at least, *in statu quo*, the most pressing object was to alleviate the disablement in locomotion resulting from the destruction of nerve tissue which had already taken place. To this end Frenkel's exercises were employed. The first thing done was to teach the patient the various movements of the body required to enable him to rise from and sit down on a chair, as a sound person does instinctively and

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generally without knowing how he does it. The successive movements included in these acts had to be learnt one by one and repeated frequently with the attention concentrated upon them by the patient till he was able to regain the power of performing them in the ordinary manner. The patient was likewise set to do walking exercises daily along a track 21 cm. broad ($8\frac{1}{4}$ inches). At first little regard could be paid to the length or regularity of the steps taken. How to advance one foot before the other, to gain sufficient control over his limbs in order to be able to place his foot upon the track at each step, and to correct the outward rotation of the legs while doing so, occupied all the patient's attention at the beginning. Not only had he to be taught in their proper sequence the various physiological movements of the body required to perform the mechanical act of progression, but he had also to learn to forget the faulty methods of moving his limbs which he had developed during the course of the disease. Progress was necessarily slow at first, but little by little improvement took place as the movements were repeated day after day with the attention concentrated upon them. After a time it became possible for the patient to take steps of a given length (30.5 cm.), and later on he learned to take steps of shorter and of longer lengths, and various combinations of steps in the manner laid down by Frenkel. Finally, practice was conducted on Frenkel's narrow track, 11 cm. wide.

After four months' treatment in the sanatorium he went to a private residence in the country, where he continued to practise in the garden the exercises which he had been taught under my supervision. Several months later he wrote to me in 1909 saying:

> Now I can assure you that the progress I have made has quite surpassed my most sanguine expectations. I have entirely discarded the use of a stick in the house; urinary troubles are vastly improved. My strength is increasing, especially in the legs; the calves have become firmer and the muscles under control. Outsiders have noticed the improvement even more than I have.

I have at intervals heard from him since, and the improvement which he enthusiastically describes has been fully maintained. About two years ago he was married, and has in no way suffered any set-back in consequence.

The case is one which corroborates very forcibly the teaching of Frenkel with respect to the ataxic conditi n. As long as a certain amount of sensibility exists in the muscles and joints, systematically performed movements, frequently repeated with the attention concentrated on the acts, produce certain impressions on the neurones still unaffected by the disease; these impressions are accumulated until their collective intensity equals that of a stronger but less frequent stimulus, and are capable of being reproduced by the central nervous system. Naturally, the greater the loss of sensation the more difficult and prolonged will the treatment be, but in Frenkel's practice it has been rare to find a case in which the sensibility of the

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muscles and joints has been so reduced as not to be capable of great improvement. In Frenkel's clinic I have myself seen patients gradually recover their powers of locomotion who, when they began the treatment, were quite incapable of walking, and only able to practise the exercises designed for bedridden persons.

The results of the Frenkel treatment are so excellent that to carry it out to best advantage I have had constructed here a permanent plant fully equipped with all the outfit Frenkel recommends for the purpose. The exercises designed to be performed in bed or on a couch are done by patients separately, but the walking exercises are best done when three or four patients are simultaneously on the track and practise them alternately, as there is then a spirit of emulation and intentness of purpose aroused which has a very beneficial influence on the result.

[Editorial Comment.]

The fact that two or three questions have been addressed to us within a comparatively recent period as to the nature of Frenkel's exercises for the restoration of co-ordinate muscular action in locomotor ataxy, seems to show that this method of treatment is not so generally known to the profession in this country as it should be. A little information on the subject may therefore not be out of place, and may at the same time serve as a commentary on the case treated in this manner by Dr. J. G. Garson, which is published in this issue. Dr. Frenkel began the work which has made his name so favourably known to neurologists in 1890. In the summer he practises at Heiden, in Switzerland, and although he works at Berlin in the winter, it is with the former place that his name is chiefly associated. A favourable reference to his method was made by Sir David Ferrier in the discussion on tabes which took place in the Section of Neurology of the meeting of the British Medical Association held in London in 1910. A complete account of Frenkel's exercises will be found in *The Treatment of Tabetic Ataxia by Means of Systematic Exercise*.[1] The first German edition appeared in 1901. We understand that a new edition is now in preparation. In that work, which is abundantly illustrated, the principles of the treatment are clearly set forth, and the exercises are fully described. What is aimed at is the re-education of the patient's muscles in co-ordination. As a consequence of the destruction of certain neurones, the patient suffering from tabes receives a defective and erroneous idea of the movement he is performing. Owing to

[1] Translated and edited by Dr. Freyberger. London: Rebman, Limited. 1902.

this, he misdirects his efforts and puts forth much more energy than is required to perform a given movement. He has in fact lost the power of regulating the movements of his muscles to a determinate end. Walking, sitting down, rising up, and so forth, though in health performed automatically, are complex acts in which a number of different muscles co-operate, the action of each being as accurately regulated in its degree as the movements of a piano player's fingers. The re-education in co-ordination of movement is therefore a laborious process requiring much skill and patience in the doctor and great perseverance on the part of the patient. A new series of "movement memories" corresponding to the impressions received in the altered conditions has to be acquired through the neurones which remain intact. It is as if telegraphic centres were utilized for the transmission of messages by a new system of wires. Frenkel's method is based upon the fact that movements attempted and carried out repeatedly and with great attention produce certain impressions on the intact neurones; these impressions are, as it were, stamped upon them and are capable of reproduction. Actions which have been acquired or developed under these conditions become so intimately combined with voluntary impulse that they can be reproduced without the effort required for the performance of a new movement. An illustration of the object aimed at by Frenkel may be found in learning to ride a bicycle. The great effort at first expended in balancing oneself and attempting to direct the machine after a time becomes unnecessary; the movements of the muscles called into play and their co-ordination become so easy and unconscious that at last the complicated act is automatic. We need not describe the treatment further than to say that it consists of (1) practising certain movements of the limbs while the patient lies in bed. This is usually done in the morning. (2) Walking exercises along lines painted on the floor or on linoleum. This is best done with three or four patients together. One of them practises for a few minutes and then rests till the others have done the exercise, when the first begins again. At the end of each turn the pulse is taken. Later on exercise may be taken in groups. (3) Sitting down, standing up, turning. (4) Walking up and down stairs. This is the most important of all the exercises. Frenkel, speaking of the results of the movement treatment, says that his method, which is based on the practice, that is, the repeated execution, of ordinary movements, rather than on vaguely defined muscular therapeutic principles, is in every case attended by a decided improvement of the inco-ordination.